

Presentation to **15th Night Operations Symposium** *October 10, 2000*



Dr. F.L. Fernandez

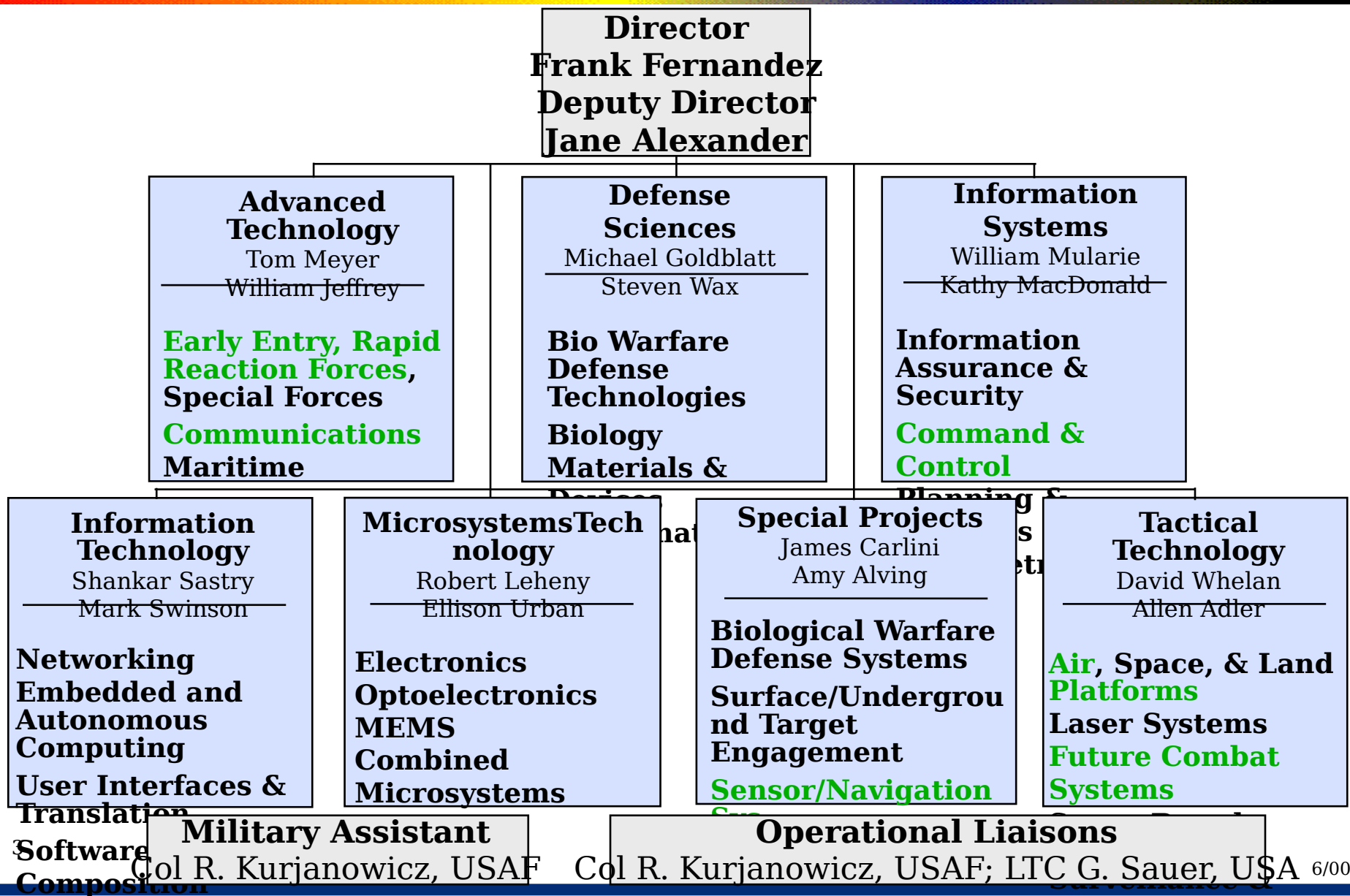
Director, Defense Advanced Research Projects
Agency



Technical Innovation in Support of National Security

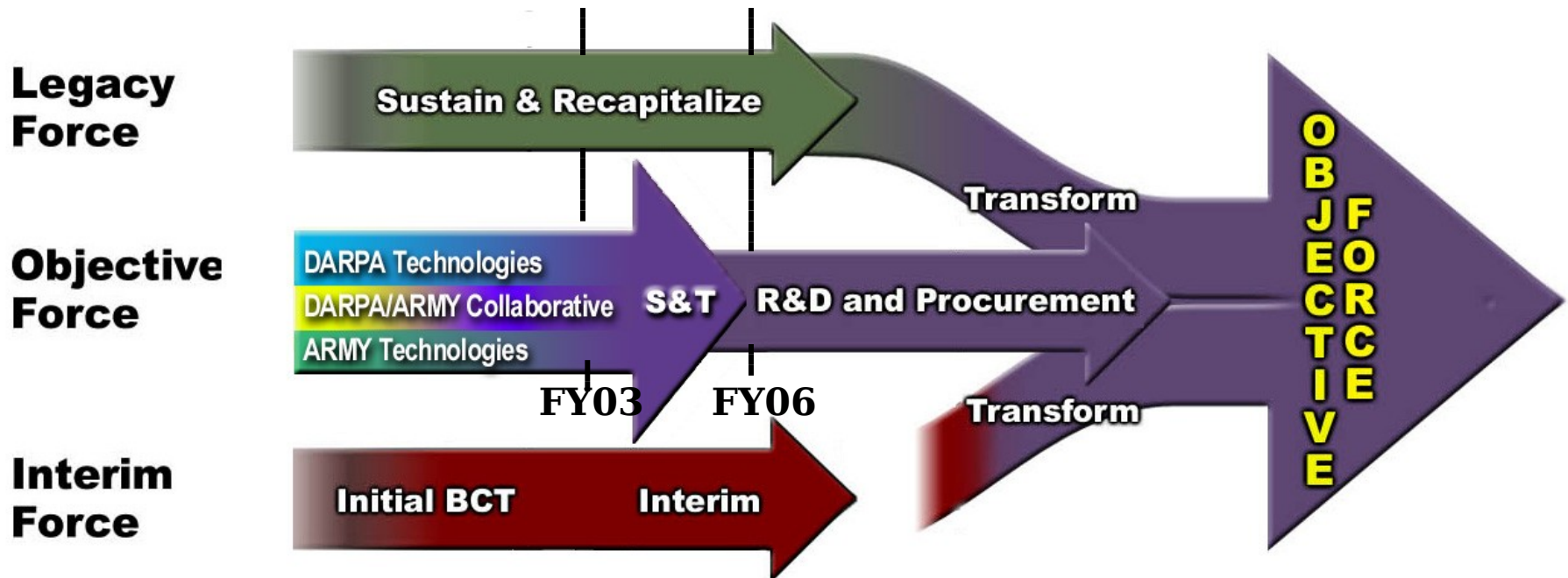
- **Solve National-level problems**
- **Enable Operational Dominance**
- **High-Risk, High-Payoff Technology Development and Exploitation**

DARPA Organization





The Army Transformation



***. . . Responsive, Deployable, Agile,
Versatile, Lethal, Survivable,
Sustainable.***

What is the FCS Program?



- *A collaborative program between DARPA and the US Army to evaluate and competitively demonstrate Future Combat Systems*
- **The FCS Program will:**
 - Define and validate FCS design/operational concepts using modeling and simulation and surrogate exercises
 - Develop key enabling technologies for distributed lighter forces
 - Fabricate and test a multi-mission FCS Demonstrator to facilitate EMD and production

Simultaneously conduct a system/concept definition and design addressing the enabling technologies, allowing a critical decision in FY 03 and the creation of a systems demonstrator by FY 06

Why DARPA?



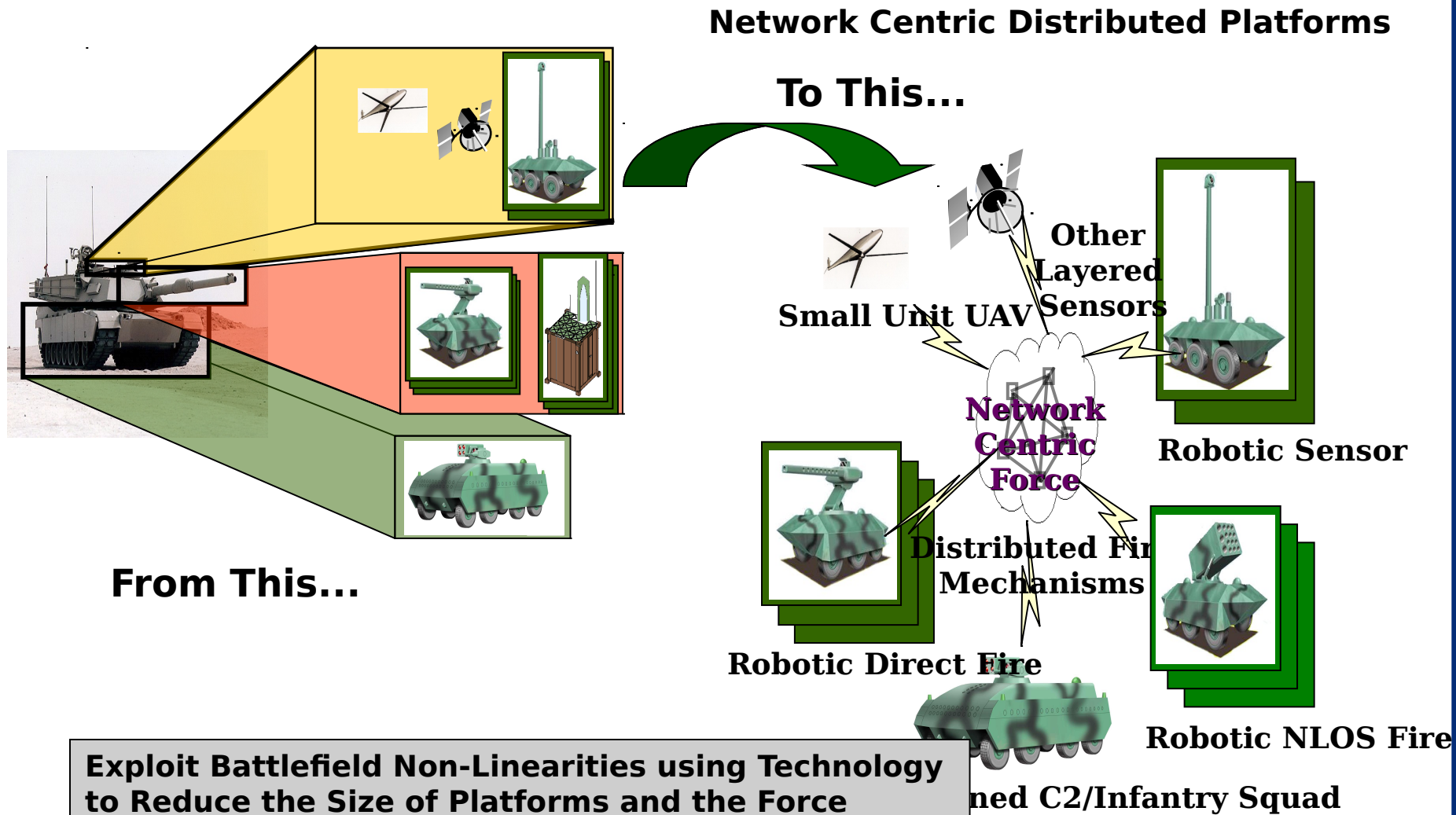
- **DARPA's role in DoD is to be the technical enabler for innovation for national security**
- **DARPA serves as a temporary independent agent to catalyze radical innovation for the Army**
- **FCS must go back to the Army for full development**

The Challenge



- **What makes the DARPA/Army Collaborative Demonstration Program so challenging?**
 - **Short-term, parallel development of system-of- systems concepts and key technology efforts**
 - **New operating concepts are being developed concurrently**
 - **System concept incorporates network warfare and relies heavily on robotics**

Baseline System Concept

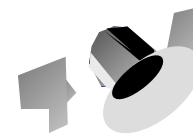


Major Technology Challenges



- Autonomous Unmanned Ground Vehicles
- Maneuver BLOS
 - Networked Fires
- Organic All-Weather Targeting Vehicles & Sensors
- Networked Command, Control & Commu

*Indirect Fire Function**



Organic & inorganic R²T¹

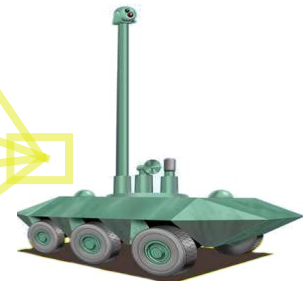


Networked Command, Control & Comms

*Direct Fire Function **



*Sensor Function**



Infantry Carrier Function



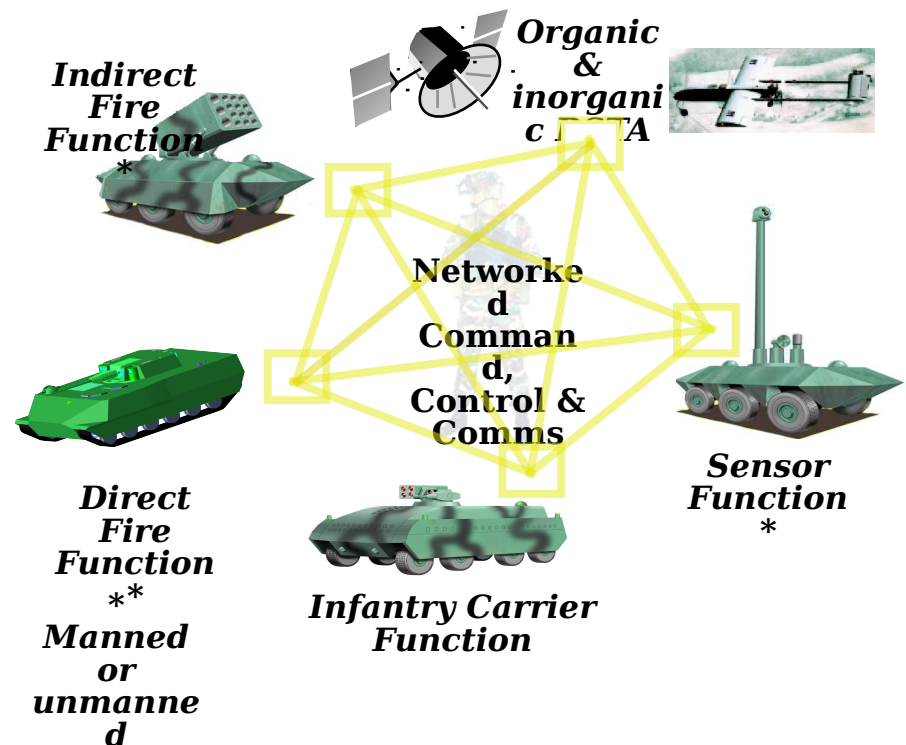
** Manned or unmanned*

Advanced Sensors are Key to the FCS Net-Centric Approach

What Makes FCS Different?



- **Network centric**
 - Know precisely, in real-time, location of all friendly and enemy forces
- **Robotics integrated into force**
 - Amplify capability of manned elements
 - Multi-functional (RSTA, armed, sustainment)
- **Increased reliance on extended range engagement**
 - Organic plus strategic and tactical support
 - Long range ISR and precision fires
- **Capable of air-mobile operations**
 - Commercial and minimum DoD strategic and tactical lift



FCS Management



- **LTC Marion Van Fosson, USA, DARPA/TTO, is Program Manager for system-of-systems work**
- **Dr. Allen Adler, DARPA/TTO, is Chief Scientist for Enabling Technologies**
- **Individual DARPA Program Managers are managing Enabling Technologies work**
- **Total program dollars:**
 - **Through FY 03: \$614.2M**
 - **FY 04 - FY 05: \$302.0M**

FCS Enabling Technologies Programs



- **FCS Communications (J. Freebersyser)**
- **Unmanned Ground Combat Vehicle (S. Fish)**
- **Perception for Autonomous Navigation (S. Fish)**
- **A160 (A. Morrish)**
 - **High-altitude, long-endurance airborne sensor platform**
 - **Sensor: ~250 lbs. payload; all-weather capable; probably RF**
- **Organic Air Vehicle - Micro Air Vehicle (S. Wilson)**
 - **Organic, airborne sensor platform, <100 lbs total vehicle weight**
 - **Sensor: EO/IR or LADAR; affordability is key**
- **FCS Command and Control (G. Sauer)**
- **LADAR Sensing for Combat ID (R. Hummel)**
- **Netfires (B. Tousley)**

NetFires



Demonstrate two LOS/NLOS weapons

- **Rapid Response PAM**

- Short time of flight (100s/25km)
- Multimode terminal guidance
- Low cost configuration: Uncooled imaging IR seeker
- Lock-on after launch

- **Hunter Killer LAM**

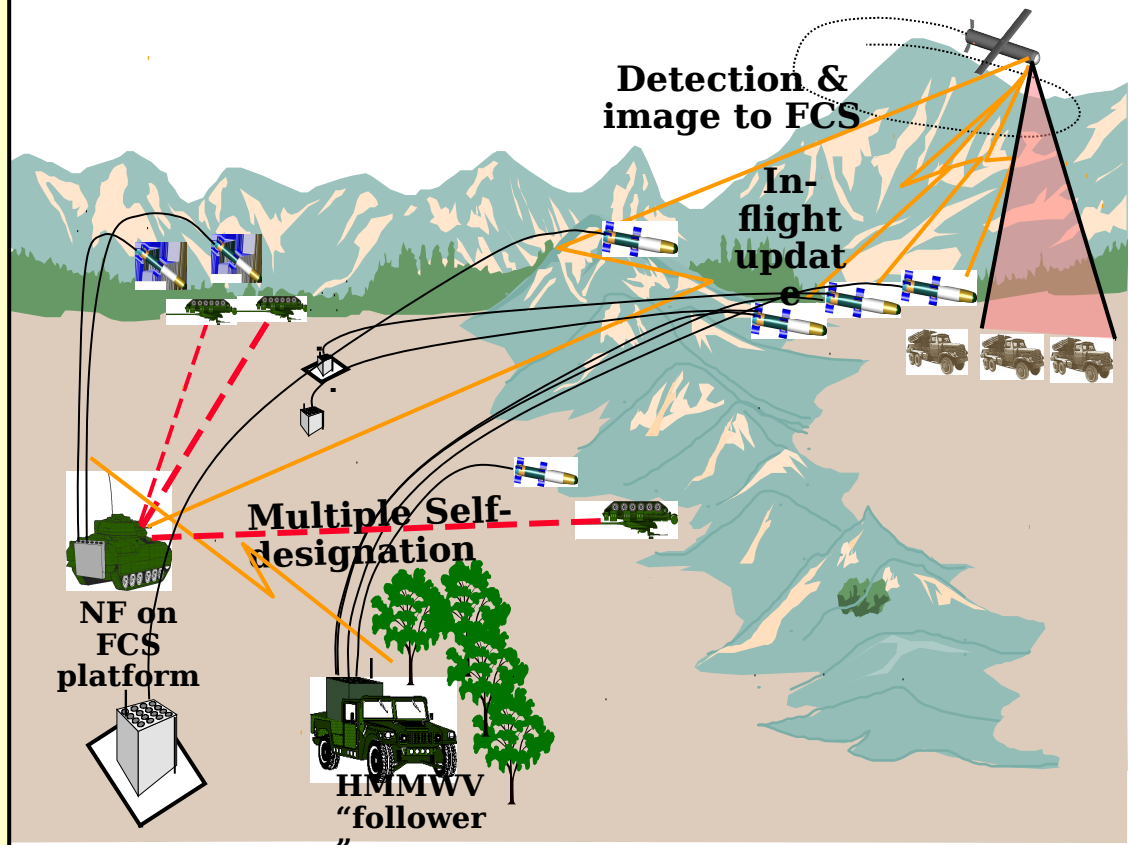
- 3-D ladar seeker w/ATR, TERCOM
- Significant loiter
- Multi-mission including BDA

- **PAM/LAM**

- GPS/INS guidance
- Variable propulsion
- Terminal guidance (end game)
- Midcourse update through networked 2-way data link

- **Platform independent launcher**

"This fundamentally reengineers close combat."



Conclusion



- **FCS Enabling Technologies programs are underway**
- **Advanced sensors are key to the FCS network-centric approach**
- **FCS next step: Experimentation and Operational Concept Development**